of fifty paces. Their skill was such that on one occasion I lost a dollar thus within half an hour.

At one time in February I found the canyon alive with quail, the whirring of whose wings met us on every hand as we rode along from hawa to hawa.

I am told there is no fish in Havasu Creek above Mooney Falls, but from the base of this fall on to the river both large and small fish are abundant. I rather doubt this, as on the occasion of my attempt to reach Beaver Falls down the course of the creek from Mooney Falls I saw no fish, nor signs of any.

One of the Havasupais tells me that mountain sheep may be seen on the northern rim of the Grand Canyon in small bands. When the snow is deep upon the Buckskin Mountains and the Kaibab Plateau they descend to the more temperate regions of the canyon where grass may be found in plenty, and then the Paiuti and Paiced Indians kill them, drying the flesh for later use. This they do regardless of a territorial law, which forbids even an Indian killing mountain sheep at any time. The Indian regards his as a prior right, existing long before there was any territorial legislature, and he acts accordingly.

Mountain lions, wildcats, lynxes, coyotes, badgers, deer, and antelope, with an occasional mountain sheep and bear, are the larger quarry of the Havasupai hunters. The deer and antelope they find in the open grassy glades of the forests on the canyon rim and reaching towards the desert. The other game is generally found in the recesses of the canyons or on the slopes of the far-away mountains of Hue-han-a-patch-a (the San Franciscos), Hue-ga-wool-a (Williams Mountain), or Hue-ga-da-wi-za (Red Butte).

At an elevation of 4000 ft., the Esplanade, 1 mi. wide in places, crumbles away in ragged steps through the upper strata of the Supai formation. Abruptly, vertical walls break away, dropping 500 to 800 ft. and forming the narrow inner gorge of Cataract Canyon. The Supai formation, composed of sandstone and shale, locally is called the Redwall in reference to its color, which contrasts with the Whitewall above. This is not to be confused with the geologic designation of the Redwall limestone, an underlying formation exposed downstream from Supai village in the area of the waterfalls. It is from the crumbling top of the Supai formation that storms wash huge boulders which tumble and crash to the canyon below. 133 [103]

The Factor of Water Supply

The existence of permanent water sources determined the residence pattern. The Havasupai have been described as seminomadic, but a more accurate term might be seasonally migratory. On the plateau, families sometimes built temporary brush shelters when they were harvesting pinyon nuts or other occasional crops, or when the tribe assembled for ceremonial or other purposes, but for the most part, families erected permanent structures to which they returned year after year as long as the house was deemed suitable. The presence of water within a reasonable distance was the determining factor in the location of both permanent and temporary camp sites, excepting those of the most transient nature. There were a number of permanent springs known on the plateau, and the karst topography provided natural reservoirs for retaining precipitation. It is speculated that the prehistoric Havasupai, with the karst examples before them and having the engineering skill and industry to build and keep in constant repair the canyon irrigation system, probably built dams on the plateau to impound water at some of the sites now similarly used by them or neighboring ranchers. 221 312 [342] [361] [241]

Water sufficient for irrigation was present at a site called Indian Gardens, which was located a short distance below the canyon rim on Bright Angel trail and which was farmed by the Havasupai in early historic times. Prospect Valley, west of Cataract Canyon, also was farmed (Spier, personal communication, 1957). In addition, several other areas, including one on the floor of Grand Canyon proper, were farmed by means of irrigation. 241 312 311

In Cataract Canyon,* a short distance above the village area, numerous springs emerge on the canyon floor, flowing over impervious shales in the Supai formation. The water is highly charged with minerals, travertine being deposited along the stream's course. This deposition accounts for some of the erratic behavior of the creek. Masses of crumbling travertine jut from the ground here and there, evidence of past shifting of the creek channel. Havasu Creek,* swollen by melting snow or desert cloudbursts, churns its banks into mud, sometimes sweeping away a man's field and the ground beneath his house. 133 312

*The names, Cataract and Havasu Canyon and Cataract and Havasu Creek, appear interchangeably in the literature and all four terms are in common usage among residents of the area. [103]

[Text continues on page 10]